M/045/017

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November 26, 1990

Mr. Frank D. Wicks, General Manager
Barrick Mercur Gold Mine
P.O. Box 838
Tooele, UT 84074

Re: Bureau Comments on July 2, 1990 Hydrogeologic Report on Dump Leach No. 2 and Tailings Pond.

Dear Mr. Wicks:

We have reviewed your July 2, 1990 report entitled "Hydrogeology Studies Dump Leach Area #2 and Tailings Impoundment Barrick Mercur Gold Mine, Utah for Barrick Resources (USA), Inc.", prepared by Dames & Moore, Salt Lake City.

We have determined that the report does not satisfy our June 20, 1989 request for a ground water monitoring plan. Comments on this report are attached for your use in future studies related to Dump Leach No. 2 and your impending ground water quality discharge permit for the tailings pond.

If you have questions please contact Loren Morton at 538-6146.

Sincerely,

Utah Water Pollution Control Committee

Don A. Ostler, P.E.
Executive Secretary

Enclosures
LBM:kc/mhf
cc: Stephen Matern, Tooele County Health Dept.
Wayne Hedberg, DOGM
Glade Shelley, Utah County Health Dept.

October 19, 1990 Bureau of Water Pollution Control Comments on:

Hydrogeology Studies Dump Leach Area #2 and Tailings Impoundment,
Barrick Mercur Gold Mine, Utah for Barrick Resources (USA), Inc., Submitted July 2, 1990

Prepared by Dames & Moore, Salt Lake City, Utah

1. Ground Water Levels and Flow Directions (p.6)

   a) Water levels in shallow monitoring wells MW-5 and 7 found above the elevation of the operating fluid head in Dump 2 effectively negates their use as ground water compliance monitoring points for Dump 2.

   b) Historic water level information, such as plotted on Plate 3 is useful for the placement of additional monitoring wells, but is not of itself satisfactory for ground water compliance monitoring for Dump 2. Barrick must provide a ground water monitoring network that allows or actual measurement of ground water levels and determination of ground water flow direction.

   c) After review of contrasting water quality between wells TMW-2 and MW-8, it will be important to evaluate vertical hydraulic gradient and flow direction in the medial limestone in order to establish the adequacy of ground water compliance monitoring points for the tailings pond.

2. Ground Water Quality (p.8)

   a) After analysis of data from a June 9, 1989 Barrick report (10 samples from October 10, 1984 to May 2, 1989), the tailings pond water is a calcium-sulfate water, not a calcium bicarbonate water as stated by Dames & Moore.

   b) Tailings pond water also exceeds the Ground Water Quality Standards for pH, fluoride, lead, and mercury (see Barrick June 9, 1989 report, referenced above).

   c) Cyanide is an uncommon and mobile contaminant in fractured carbonate ground water flow systems, and therefore, is also a useful key indicator of pollution.

   d) A dramatic difference in ground water quality and major ions exists between wells MW-8 and TMW-2, both of which intercept the same medial limestone aquifer and of which MW-8 appears to be downgradient. Unfortunately, no explanation for this differential is provided in the report. The ground water discharge permit application for the tailings pond, due March 27, 1991, must explain this differential.

   e) No nitrite analysis results have been reported to substantiate the claim on page 10 that nitrite concentrations in MW-9 were extremely low.

3. Conclusions (p.11)

a) Comparison of water level data from wells MW-9, CD-2, and CD-4 (see Plate 3) indicate a southeasterly flow direction, contrary to the statement on page 11 that ground water flows easterly to northeasterly. Actual flow direction will need to be established from active monitoring wells, based on current water level data, in order to demonstrate a viable ground water compliance monitoring well network.

b) Upgradient ground water monitoring wells will be needed in order to assess any impact of Dump 2 or the tailings pond on ground water quality, and to provide an adequate compliance monitoring well network for these existing facilities.

4. Appendix A

a) Geophysical Log Interpretation (p.A-14) - density and neutron logs are not reliable when not run in conjunction with a borehole caliper that causes the sonde to be decentralized in the borehole.

b) Aquifer Tests and Analysis Methods (p.A-16) - the Cooper, Bredehoft, and Papadopoulos (1967) method assumes a fully penetrating well installed in a confined aquifer. MW-8 encountered only a 15.21 foot thick saturated zone in a 52.8 foot long screened interval (compare Table A-24 and Table A-25). Consequently, the Cooper, et.al. solution method is not applicable to MW-8. Analysis of the bail data must be redone with an appropriate solution method.

c) Results of Aquifer Tests (p.A-20)

1) Well MW-5 - because the plot on Plate A-12 does not form a straight line the residual drawdown of well MW-5 may not be governed by the Cooper-Jacob equation (see page A-18). Another solution method is appropriate.

2) Well MW-9 - because MW-9 did not encounter the Long Trail Shale (see Plate A-6), its partially penetrating nature would have caused a higher drawdown response, for a given pumping rate, than a fully penetrating well. Consequently, the slope of the residual drawdown from Plate A-14 is likely greater than the actual slope had the well fully penetrated the aquifer. This would cause the average permeability value on page A-21 to be a minimum value; actual permeability could be higher than the value reported.